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Mines and Mineral Statistics of New South Wales, etc. Compiled by direction of the Hon. John Lucas, M. P., Minister for Mines. Also Remarks on the Sedimentary Formations of New South Wales. By the Rev. W. B. Clarke, etc. Sydney. 1875. 8vo, pp. 252.

The Art of Projecting. A Manual of Experimentation in Physics, Chemistry, and Natural History with the Porte-Lumière and Magic Lantern. By Prof. A. E. Dolbear. Illustrated. Boston: Lee & Shepard. 1877. 12mo, pp. 158. $1.50.

Thier Leben. Von A. E. Brehm. Erste Reihe. Die Handthiere. Heft i. Leipzig. 1877. 8vo. Profusely illustrated. For sale by B. Westermann & Co., New York.

Science Lectures at South Kensington. Photography. By Captain Abney. Sound and Music. By Dr. W. H. Stone. Kinematic Models. By Professor Kennedy. With Illustrations. London and New York: Macmillan & Co. 1876. 12mo. 20 cents each.

Manchester Science Lectures for the People. Eighth Series. 1876–77. What the Earth is Composed of. Three Lectures by Professor Roscoe. With Illustrations. London and New York: Macmillan & Co. 1876. 12mo, pp. 40. 20 cents.

Scientific Results of the Exploration of Alaska. By the parties under the charge of W. H. Dall, during the Years 1865–1874. Vol. i., No. 1. Introductory Note on the Marine Faunal Regions of the North Pacific, by W. H. Dall. Art I. Report on the Hydroids, by S. F. Clark, with Plates i–x. Art. II. On the Extension of the Seminal Products in Limpets, with Remarks on the Phylogeny of the Docoglossa, by W. H. Dall. December, 1876. W. H Dall, Smithsonian Institution. Washington, D. C. 8vo, pp. 34.

Bulletin of the Illinois Museum of Natural History. No. 1. Bloomington, Ill. December, 1876. 8vo, pp. 76.

Report upon New Species of Coleoptera collected by the Expeditions for Geographical Surveys west of the 100th Meridian. Lt. G. M. Wheeler in charge. By J. L. LeConte; being extract from Appendix JJ of the Annual Report of the Chief of Engineers for 1876. Washington, D. C. 8vo, pp. 5.

Biographical Notice of the late Archibald R. Marvine. By J. W. Powell. (From the Bulletin of the Philosophical Society of Washington, D. C.) 8vo, pp. 8.

Palæontological Bulletin, No. 23. On some Extinct Reptiles and Batrachia from the Judith River and Fox Hills Beds of Montana. By E. D. Cope. (Extracted from the Proceedings of the Academy of Natural Sciences of Philadelphia, December, 1876.) 8vo, pp. 20.

Half Hours with Insects. By A. S. Packard, Jr. Boston: Estes & Lauriat. 1877. 12mo, pp. 384. $2.50.

Forest Culture and Eucalyptus Trees. By Ellwood Cooper. San Francisco. 1876 12mo, pp. 204. $1.50.

GENERAL NOTES.

BOTANY.[1]

A List of the Lichenes found growing within Twenty Miles of Yale College.

1. Ramalina, *Ach.*, *De Not.*
    1. calicaris, *Fr.*, var. fraxinea, *Fr.*, on trees; and var. farinacea, *Fr.* on rocks; and var. canaliculata, *Fr.*
    2. rigida, *Ach.* On cedars (*J. Virginiana*), rare; Short Beach, Branford; *Alfred Barron.*

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[1] Conducted by Prof. G. L. Goodale.

2. Cetraria, *Ach.*, *Fr.*
    1. Islandica, *Ach.* On dry ground in open woods.
    2. ciliaris, *Ach.* On old fence rails and dead trees.
    3. lacunosa, *Ach.*, and var. Atlantica, *Tuckerm.* On trees, etc. Not very common.
    4. aleurites (*Ach.*), *Th.*, *Fr.* Only one specimen found, on an old fence rail; Killingworth; *F. W. H.*
3. Evernia, *Ach.*, *Mann.*
    - prunastri (*L.*), *Ach.* Killingworth, *F. W. H.;* Orange, *Prof. D. C. Eaton.* On rocks; not common.
4. Usnea, *Ach.*
    1. barbata (*L.*), *Fr.*, var. florida, *Fr.*, and var. rubiginea, *Michx.*, and var. dasypoga, *Fr.* The last var. forming long pendent gray clusters from dead limbs of our forest trees.
    2. angulata, *Ach.* Near Lake Saltonstall; *Prof. Eaton.* Not very common.
5. Alectoria (*Ach.*), *Nyl.*
    - jubata (*L.*) var. chalybeiformis, *Ach.* Mostly on old fence rails.
6. Theloschistes, *Norm.*, *Tuckerm.*
    1. parietinus (*L.*), *Norm.*, and var. lychneus, *Schær.* On rocks and trunks of trees.
    2. chrysophthalmus (*L.*), *Norm.*, and var. flavicans, *Wallr.* On trunks and branches of trees: a pretty species with golden eyes.
    3. concolor (*Dicks.*), (*T. candelarius* (*Ach.*), *Nyl.*, var. *stellata*, *Nyl.*). On bark of trees.
7. Parmelia (*Ach.*), *De Not.*
    1. perforata (*Jacq.*), *Ach.*, and var. crinita, *Tuckerm.* Especially abundant on old stone walls.
    2. tiliacea (*Hoffm.*), *Floerk.* On stones and bark of trees.
    3. Borreri, *Turn.*, and var. rudecta, *Tuckerm.* On old fence rails; Killingworth; *F. W. H.*
    4. saxatilis (*L.*), *Fr.* Wallingford, *Alfred Barron;* Killingworth, *F. W. H.* On rocks.
    5. physodes (*L.*), *Ach.* Old rails, etc.
    6. colpodes, *Ach.* Wallingford; *A. Barron.*
    7. caperata (*L.*), *Ach.* Old fence rails and trunks of trees.
    8. conspersa (*Ehrh.*), *Ach.* Particularly abundant on exposed rocks and on old stone walls. Our most common species.
    9. olivacea (*L.*), *Ach.* On living and dead bark of trees.
8. Physcia (*Fr.*), *Th.*, *Fr.*
    1. aquila (*Ach.*), *Nyl.*, var. detonsa, *Tuckerm.* On rocks.
    2. pulverulenta (*Schreb.*), *Nyl.* Wallingford, *A. Barron;* Killingworth, *F. W. H.* On rocks and trunks.
    3. speciosa (*Wulf.*, *Fr.*), and var. hypolenca, *Ach.*, and var. lencomela (*Eschw.*). On rocks, etc.

4. stellaris (*L.*), *Nyl.*, and var. hispida, *Fr.* On rocks and bark of trees.
5. obscura (*Ehrh.*), *Nyl.*, and var. ciliata, *Tuckerm.*, and var. erythrocardia, *Tuckerm.*, and var. adglutinata, *Schær.* On rocks; the latter var. abundant on currant bushes (*Ribes rubrum*).

9. UMBILICARIA, *Hoffm.*
    1. pustulata (*L.*), *Hoffm.* According to my observations, this species is most common on high rocks in river bottoms, where it is exposed to the water in times of freshets.
    2. Dillenii, *Tuckerm.* Same habitat as above.
    3. Muhlenbergii (*Ach.*), *Tuckerm.* On rocks.

10. STICTA (*Schreb.*), *Delis.*
    1. crocata (*L.*), *Ach.* On trunks and rocks.
    2. quercizans (*Michx.*), *Ach.* On rocks; not common. Killingworth, *F. W. H.;* Orange, *F. W. H.*
    3. pulmonaria (*L.*), *Ach.* On trunks of trees.
    4. glomerulifera (*Lightf.*), *Delis.* On rocks.

11. NEPHROMA, *Ach.*
    1. lævigatum, *Ach.* Killingworth and Orange; *F. W. H.* Not very common.

12. PELTIGERA (*Hoffm.*), *Fée.*
    1. aphthosa (*L.*), *Hoffm.* Moist, mossy banks, among woods.
    2. canina (*L.*), *Hoffm.*, and var. spuria, *Ach.* On damp ground.
    3. polydactyla (*Neck.*), *Hoffm.* Damp ground in woods, etc.
    4. rufescens (*Neck.*), *Hoffm.* Damp ground in woods, etc.

13. PANNARIA, *Delis.*
    1. lanuginosa (*Ach.*), *Koerb.* Killingworth; *F. W. H.* Trunks and earth.
    2. lurida (*Mont.*), *Nyl.* On the ground and rocks.
    3. tryptophylla, *Ach.*, *Mass.* On basalt; Hampden; *Prof. Eaton.*
    4. microphylla (*Sw.*), *Del.* Trunks, etc.
    5. leucosticta, *Tuckerm.* Trunks, banks, etc. Killingworth; *F. W. H.*
    6. molybdæa (*Pers.*), *Tuckerm.*, var. cronia, *Nyl.* Trunks, rocks, etc. Killingworth; *F. W. H.*

14. EPHEBE, *Fr.*
    - pubescens (*Ach.*), *Fr.* West Rock; *Prof. Eaton.*

15. COLLEMA (*Hoffm.*), *Fr.*
    1. flaccidum, *Ach.* Bark, especially of the cedar (*J. Virginiana*).
    2. nigrescens (*Huds.*), *Ach.* Same habitat as above.

16. LEPTOGIUM, *Fr.*
    1. lacerum (*Sw.*), *Fr.* Moist rocks, etc.
    2. pulchellum (*Ach.*), *Nyl.* Moist rocks, earth, etc.
    3. tremelloides (*L.*), *Fr.* Earth and rocks.
    4. chloromelum (*Sw.*), *Nyl.* Moist rocks.

5. myochroum (*Ehrh.*), *Schær.*, var. saturninum (*Dicks.*), *Tuckerm.* Moist rocks, etc.

17. HYDROTHYRIA, *Russell.*

venosa, *Russell.* Rivulets; Mt. Carmel and West Rock; *Prof. Eaton.*

18. PLACODIUM (*D. C.*) *Naeg.*, and *Hepp.*

1. elegans, *D. C.*) Trunks of trees, etc.
2. vitellinum (*Ehrh.*), *Hepp.* Wallingford; *A. Barron.*
3. cerinum (*Hedw.*), *Naeg.*, and var. hæmatites, *Fr.*
4. aurantiacum (*Lightf.*), *Naeg.* Trunks.

19. LECANORA, *Ach.*, *Tuckerm.*

1. muralis (*Schreb.*), *Schær.* Wallingford; *A. Barron.*
2. pallescens (*L.*), *Fr.* Rocks; Killingworth; *F. W. H.*
3. tartarea (*L.*), *Ach.*, and var. frigida, *Ach.* Rocks.
4. subfusca (*L.*), *Ach.* On trees and rocks, mostly the latter.
5. albella, *Ach.* (*L. pallida* (*Schreb.*), *Schær.*), and var. cæsio-rubella (*Ach.*). On living bark.
6. varia (*Ehrh.*), *Fr.* On old board and rail fences.
7. cinerea (*L.*), *Fr.* Stones, etc.
8. cervina (*Pers.*), *Sommerf.*, var. discreta, *Fr.*, and var. privigna, *Ach.*, and var. clavus, *D. C.* Killingworth; *F. W. H.* Rocks and stones.

20. RINODINA, *Mass.*, *Stizenb.*

1. sophodes (*Ach.*), var. confragosa, *Nyl.* Rocks and stones. Killingworth, *F. W. H.;* Wallingford, *A. Barron.*
2. constans (*Nyl.*), *Tuckerm.* Wallingford; *A. Barron.*

21. PERTUSARIA, *D. C.*

1. pertusa (*L.*), *Ach. s. Por.* Trunks of trees and rocks.
2. leioplaca (*Ach.*), *Schær.* Trunks and rocks.
3. velata (*Turn.*), *Nyl.* Mostly on trunks.
4. multipuncta (*Sm.*), *Nyl.* Trunks and branches.
5. pustulata (*Ach.*), *Nyl.* Trunks and branches.
6. globularis, *Ach.* Rocks and trunks.

22. CONOTREMA, *Tuckerm.*

urceolatum (*Ach.*), *Tuckerm.* Wallingford, *A. Barron;* Killing worth, *F. W. H.* On bark of trees, especially on maples (*Acer rubrum* and *A. saccharinum*).

23. URCEOLARIA (*Ach.*), *Flot.*

1. scruposa (*L.*), *Ach.* Wallingford; *A. Barron.*
2. actinostoma, *Pers.* Sent from Wethersfield to *Mr. Willey.*

24. STEREOCAULON, *Schreb.*

paschale, *Laur.* On rocks at Mt. Carmel, etc.

25. CLADONIA, *Hoffm.*

1. papillaria (*Ehrh.*), *Hoffm.* On dry hills. Killingworth; *F. W. H.*
2. alcicornis, *Fr.* Rocks and earth.

3. pyxidata (*L.*), *Fr.* Earth.
4. cariosa (*Ach.*), *Spreng.* Earth.
5. fimbriata (*L.*), *Fr.*, and var. adspersa, *Tuckerm.* Earth, etc.
6. gracilis (*L.*), *Fr.*, and var. verticillata, *Fr.* Earth.
7. mitrula, *Tuckerm.* Wallingford; *A. Barron.* Earth.
8. furcata (*Huds.*), *Fr.*, and var. cristata, *Fr.*, and var. racemosa, *Flk.*, and var. lacunosa, *Flk.* Dry hills and open woods.
9. rangiferina (*L.*), *Hoffm.*, and var. sylvatica, *L.*, and var. alpestris, *L.* Dry hills and open woods.
10. uncialis (*L.*), *Fr.* Hilly ground among woods.
11. lacunosa, *Del.* Hilly ground among woods.
12. cornucopioides (*L.*), *Fr.* Rich ground and on rotten stumps.
13. cristatella, *Tuckerm.* Mostly on decayed stumps and fence rails.

26. BÆOMYCES, *Pers.*, *Nyl.*

roseus, *Pers.* Sandy banks.

27. BIATORA, *Fr.*

1. vernalis (*L.*), *Th.*, *Fr.* Earth and trees.
2. russula (*Ach.*), *Mont.* Killingworth; *F. W. H.* Trees; exceedingly rare.
3. sanguineo-atra (*Fr.*), *Tuckerm.* Moist banks and trunks.
4. exigua (*Chaub.*), *Fr.* Bark of trees.
5. rubella (*Ehrh.*), *Rabenh.*, and var. muscorum, *Nyl.* Moist banks.

28. LECIDEA (*Ach.*), *Fr.*

1. albo-cœrulescens, *Fr.* On rocks and stones.
2. contigua, *Fr.*, *Nyl.* On rocks, etc.
3. spilota, *Fr.* Wallingford; *A. Barron.*

29. BUELLIA, *De Not.*, *Tuckerm.*

1. lactea, *Mass.* Wallingford; *A. Barron.*
2. lepidastra, *Tuckerm.* On rocks. Wallingford, *A. Barron;* Killingworth, *F. W. H.*
3. parasema (*Ach.*), *Koerb.* Trunks and branches.
4. myriocarpa (*D. C.*), *Mudd.* Rocks, trees (?), etc. Killingworth; *F. W. H.*
5. petræa (*Flot.*), *Tuckerm.* On rocks and stones. Killingworth; *F. W. H.*

30. OPEGRAPHA (*Humb.*), *Ach.*, *Nyl.*

varia (*Pers.*), *Fr.*

31. GRAPHIS (*Ach.*), *Nyl.*

scripta (*L.*), *Ach.*, and var. limitata, *Schær.* Bark of trees. Killingworth, *F. W. H.;* Wallingford, *A. Barron.*

32. ARTHONIA, *Ach.*, *Nyl.*

1. astroidea, *Ach.*, *Nyl.* Bark of trees. Killingworth; *F. W. H.*
2. punctiformis, *Ach.* Bark of trees. Killingworth; *F. W. H.*
3. tædiosa, *Nyl.* Bark of trees, and rocks (?). Killingworth; *F. W. H.*

33. MYCOPORUM (*Flot.*), *Nyl.*
pycnocarpum, *Nyl.* Killingworth; *F. W. H.*

34. ACOLIUM (*Fée.*), *De Not.*
tigillare (*Ach.*), *D. N.* Wallingford; *A. Barron.*

35. CALICIUM, *Pers.*, *Fr.*
subtile, *Fr.* On old boards and fence rails. Killingworth; *F. W. H.*

36. ENDOCARPON, *Hedw.*, *Fr.*
miniatum (*L.*) *Schær.*, and var. complicatum, *Schær.*, and var. aquaticum, *Schær.* On submerged stones in rivulets; also on damp exposed rocks.

37. TRYPETHELIUM, *Spreng.*, *Nyl.*
virens, *Tuckerm.* Wallingford; *A. Barron.*

38. PYRENULA (*Ach.*), *Naeg.*, and *Hepp.*
1. punctiformis (*Ach.*), *Naeg.* On trunks of trees. Killingworth; *F. W. H.*
2. nitida, *Ach.* On trunks of trees. Wallingford, *A. Barron;* Killingworth, *F. W. H.* — F. W. HALL.

MINOT'S NEW ENGLAND BIRDS; ADDITIONS. — In my late work on New England Birds, by carelessly overlooking one of my own memoranda, I omitted mention of the Swallow-tailed Kite (*Nauclerus forficatus*), once *seen* near Whately, Mass., of the melanistic Swainson's Buzzard (*Buteo Swainsoni, insignatus*), *captured* in Massachusetts, and of the Arkansas Flycatcher (*Tyrannus verticalis*) recorded from Plympton Me. *Helminthophaga pinus* is a summer resident at Saybrook, Conn. (*Purdie.*) December 1876. — H. D. MINOT.

LARGE TRUNKS OF KALMIA LATIFOLIA. — It is well known that this *Kalmia* attains its maximum size in the southern Alleghanies. Probably nothing upon record exceeds or even equals the following measurements of the girth of two trees which grow, along with others not very much smaller, in the bottom of a dell back of Cæsar's Head, on the extreme western border of South Carolina. One trunk, at a foot or so from the ground,measured four feet one and a quarter inches in circumference, and, rising without division, maintains a size approaching this and gradually lessening, for six or seven feet.

Another trunk measured three feet four inches in girth above the first limb or fork; below it, at nearly one foot from the ground, it measured four feet and four inches. The measurements were taken September 2, 1876, by Dr. George Engelmann, William M. Canby, and ASA GRAY.

THE PRODUCTION OF STARCH IN CHLOROPHYLL-GRANULES. — Böhm asserts that if light is sufficiently intense to induce assimilation in green leaves, it has the power to cause an immediate transfer of starch *from* the stem, where elaborated matters may be stored, *to* the chlorophyll-granules. For this reason he believes that many observations hitherto made in regard to the immediate production of starch from carbonic dioxide in chlorophyll are untrustworthy. Such experiments should be made upon plants which have no starch already stored up, or upon detached leaves which contain no starch.

THE EFFECT OF FROST ON CHLOROPHYLL-GRANULES. — Haberlandt states that the granules except in evergreens undergo changes at 4° to 6° C. The granules thus affected contain cavities (vacuoles), become rent on the outside, and aggregate into larger or smaller masses. The granules which contain starch are more easily destroyed by frost than those which contain none. The chlorophyll in the palisade tissue (the denser parenchyma) is more easily injured than that in the spongy tissue, and the latter than that in the guardian cells of the stomata.

DICHOGAMY OF AGAVE. — The flowering of a plant of *Agave yuccæfolia* Red. (Bot. Mag. t. 3213), in a private collection near Boston, has given abundant opportunity to watch the development of its flowers, and to confirm in regard to this species Engelmann's statement (Notes on Agave. Transactions of the Academy of St. Louis, vol. 3, December, 1875), that the flowers of this genus are "vespertine or nocturnal, and *proteranderous*."

Agave yuccæfolia must be referred to Engelmann's second section, *Geminifloræ*, although on our plant the lower flowers alone are borne in pairs. The forty uppermost flowers of the spike spring singly each from the axis of a bract, and in this approach his first section, *Singulifloræ*. The production of solitary flowers on the upper portion of the spike is possibly abnormal; but should this prove a constant character a slight modification of Engelmann's sections of the genus will become necessary. In the figure in the *Botanical Magazine* the arrangement of the flowers is not distinct; but in the accompanying description we read, "Flowers *often* two together."

The scape first made its appearance on November 1st, and continued to grow until January 6th, when it had attained a height of ten feet, the first flowers opening about five P. M. on that day. Shortly after the opening of the flower the filaments attain their full development, and are exserted 9′′ beyond the lobes of the perigone. The style at this time is barely exserted and much reflexed, the stigma bearing these papillose lines radiating from its centre down the middle of each of the three lobes. A little before eight o'clock on the morning after the opening of the flower, the tube of the perigone is entirely filled with the honeyed secretion, which is slightly odoriferous, sapid, straw-colored, and very abundant. At ten P. M. of the second day, or seventeen hours after the opening of the flower, the anthers burst. At this time the style has elongated and partially straightened until the stigma, over which the papillæ have not as yet extended, is placed just above the introrse anthers, and in such a position that none of the pollen discharged from them can reach its surface. During the third day the style continues to elongate and straighten. On the morning of the fourth day the style is found to be perfectly erect and exserted 16′′ beyond the lobes of the perigone, or 7′′ beyond the stamens at their fullest development. The papillæ have now extended laterally over the entire surface of the stigma, from which is freely secreted a clear, colorless, sticky liquid.

The stigma is now perfectly developed, and ready to receive the pollen grains;[1] but it is more than forty-eight hours since the anthers discharged their pollen, and for the last twelve they have hung useless and effete, and are already beginning to drop off. It is evident, then, that flowers of our *Agave* must depend for fertilization either on the very uncertain chance of some of the pollen discharged from the anthers of the upper flowers, dropping just at the right moment on the developed stigmas of the lower and older ones, or on the visits of some nocturnal insect, on the search for the abundant and attractive secretions contained in the tube of the perigone. Fertilization of the lower flowers is probably secured by both these agencies. Those placed higher up on the scape can only be made productive by pollen brought from other plants and placed on their stigmas at the moment of their maturity. — C. S. SARGENT.

PHYLLOTAXIS OF CONES.[2] — I wish here to supplement an article which appeared in the American Naturalist in August, 1873. Mention is there made of finding cones of several species in which the phyllotaxis of part of them consists in opposite leaves more or less spirally arranged. The fraction expressing the arrangement for scales on such cones falls into the series $\frac{2}{4}$, $\frac{2}{6}$, $\frac{4}{10}$, $\frac{6}{16}$, $\frac{10}{26}$, etc. One cone of a European larch was recorded having three, six, and nine spirals, and falling into the series $\frac{3}{6}$, $\frac{3}{9}$, $\frac{6}{15}$, $\frac{9}{24}$, $\frac{15}{39}$, etc., or having the scales in whorls of three.

This summer, on examining about three pecks of cones from one tree of the European larch, three more cones were found in which the arrangement of scales falls into the series beginning with decussate whorls of three. I have now found a single cone on which there are four spiral whorls in one direction, and four and eight in the opposite direction. The fraction expressing its phyllotaxis is $\frac{8}{24}$, and falls into the series beginning with decussating verticels of four, namely, $\frac{4}{8}$, $\frac{4}{12}$, $\frac{8}{20}$, $\frac{12}{32}$, $\frac{20}{52}$, etc. Some of these cones were exhibited with the scales marked in ink.

In reply to some questions of Professor Morse, as to whether all the cones had a phyllotaxis like the examples mentioned, Professor Beal remarked that the arrangement of most cones of the European larch was that of alternate leaves, and was expressed by the fraction $\frac{8}{21}$, falling into the series $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{5}{13}$, etc. The fraction for a few cones with alternate leaves was $\frac{8}{29}$, falling into the series $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{7}$, $\frac{3}{11}$, $\frac{5}{18}$, $\frac{8}{29}$, etc. In a few cones with opposite scales it was $\frac{10}{26}$, falling into a series given above. In a few others in whorls of three the fraction was $\frac{6}{15}$; in one cone the scales were in whorls of four. How many additional forms may be found on examining large numbers of specimens he did not know, but presumed we had not yet found them all. On all the trees examined, he had found the spiral whorls of the scales to vary; that certain spirals ran to the right in part of the cones, and to the left in about the same number on each tree in each year; that in all cases examined there was quite a variety in the phyllotaxis of each tree. So he had found it on many herbaceous plants.

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[1] I have failed to detect in *A. Yuccæfolia* any opening between the lobes of the stigma at its maturity as noticed by Engelmann in *A. Virginica,* and by Jacobi (Ag. 310) in *A. Gœppertiana.*

[2] Read in Buffalo before the American Association for 1876 by Professor W. J. Beal.

As we might expect, there was no one, fixed, undeviating plan for the arrangement of all the leaves on plants of any species; we should find exceptions to our rules if we examine specimens enough.

BOTANICAL NOTES FROM RECENT PERIODICALS.—*Flora.* (No new numbers have been received since our last review.)

Botanische Zeitung, No. 43. O. Behrendsen, Contributions to the Flora of Hungary. No. 44. E. Stahl, On the Artificial Formation of Protonemata from the Sporogonium of Musci. (In true mosses the protonema is a tubular outgrowth from the spore. This minute tube elongates by growth at the tip, and afterwards branches. Pringsheim has shown (1876) that protonematous threads may be produced from the severed fruit-stalk of mosses. This is now confirmed by Stahl, who also shows its bearing upon alternation of generation, and examines its relations to Dr. Farlow's interesting discovery of an asexual growth on the prothallus of ferns.) Cramer, Note claiming Priority of Discovery respecting Reproduction in *Ulothrix*. Reports of Societies. Nos. 45 and 46 previously noticed. No. 47. Fickel, On the Anatomy and Development of the Seed-Coats of some *Cucurbitaceæ*. Continued in Nos. 48, 49, and 50. No. 51. Dr. Drude, On the Separation of the Palms of America from those of the Old World.

ZOÖLOGY.

A NEW SUB-KINGDOM OF ANIMALS.—Prof. E. Van Beneden in his elaborate "Recherches sur les Dicyemides, Survivants actuels d'un Embranchement des Mésozoaires" proposes a new sub-kingdom of animals. In 1830 Krohn observed the presence in the liquid bathing the spongy bodies (perhaps renal organs) of different species of Cephalopods certain filiform bodies, covered with vibratile cilia and resembling infusoria or ciliated worms. They were called *Dicyema* by Kölliker, who, with others, considered them as intestinal worms; Van Beneden claims that they have no general body-cavity. The body is formed (1) of a large axial cylindrical or fusiform cell, which extends from the anterior extremity of the body, enlarged into a head, to the caudal extremity; (2) of a single row of flat cells forming around the axial cell a sort of